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Mazdoor Kisan Shakti Sangathan

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 11133 (1984): Recommendations for symbols for lubrications appearing on machine tools [PGD 3: Machine Tools]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

RECOMMENDATIONS FOR SYMBOLS FOR LUBRICATIONS APPEARING ON MACHINE TOOLS

- 1. Scope** — Gives guidance to both manufacturers and users of machine tools on the information to be provided and followed regarding the lubrication instructions.
- 2. Definitions** — For the purposes of this standard the following definitions shall apply.
 - 2.1 Lubrication Point** — The point at which lubricant is fed in order to lubricate a bearing surface.
 - 2.2 Action Point** — The point in a lubrication system where, in general, an external action is carried out to ensure the correct operation of the system.

Example

Filling with lubricant (nipples or reservoir, etc), actuation of lever, etc.

3. Technical Documentation

- 3.1 Lubrication Instructions** — All information concerning the lubrication of the machine tool shall be contained in a single document called 'Lubrication Instructions' which shall be compiled by the machine tool manufacturer.

Note — The 'Lubrication Instructions' may form a part of the general instruction manual.

- 3.2 Technical Data to be Included in the Lubrication Instructions** — Lubrication instructions shall indicate the following.

- 3.2.1** The designation of machine components to be lubricated.
- 3.2.2** The exact location of all action points.
- 3.2.3** The type of action to be performed (inspection, replenishing, cleaning, lubricant change, actuation of a lever, etc).
- 3.2.4** The classification of the lubricants to be used for the purpose of this standard has been given in Appendix A.

3.2.5 Viscosity grades and kinematic viscosity of the liquid lubricants which shall conform to IS : 9466-1980 'Viscosity classification for industrial liquid lubricants', have been given in Appendix B.

3.2.6 The grades of grease and their worked penetration numbers have been given in Appendix C. The grades of grease are numbered according to their consistency following the classification system of the National Lubricating Grease Institute (NLGI) of the USA. The consistency is related to worked penetration which is determined by cone penetration method in accordance with IS : 1448 (Part 60)-1971 'Method of test for petroleum and its products: Part 60 Consistency of lubricating greases by cone penetrometer (first revision)'.

3.2.7 The time interval in machine tool running hours at which each action point requires attention.

3.3 Schematic Representation of Lubrication Instructions — The instructions listed in 3.2 shall be illustrated by means of diagrams, photographs or schematic views. Care should be taken to avoid those details which could lead to misunderstanding, by keeping the illustrations as simple as possible.

A copy of such illustrations shall be made available on the machine.

3.4 Lubrication Instructions Facsimile — An example of lubrication instructions for a particular machine tool which shall be followed as regards layout is concerned has been given at Appendix D. All symbols used in the lubrication instructions shall, where they are provided for, comply with IS : 2182-1962 'Recommendation for symbols to be given on indication plates for machine tools'.

3.5 Minimum Requirements — The basic information contained in Appendix D is the minimum necessary to comply with 3.2.

4. Data Plates for Use on the Machine

4.1 It is recommended that wherever practicable a single plate complying with the requirements (see 3) be permanently attached to the machine.

Note — At the option of the user, small data plates may also be attached to each action point.

4.2 Small Data Plates for Individual Action Points — If these small plates are to be used on the machine, they shall be rigidly fixed close to the action points, and shall be located so as not to be confused with other points. They shall indicate lubrication instructions only.

4.2.1 Technical data to be indicated on the plates — Letters and numbers shall be easily readable.

The colour should preferably be yellow, with the figures in black. Small data plates should indicate the following.

4.2.1.1 Action point number

4.2.1.2 Symbol of the action to be performed according to IS : 2182-1962.

4.2.1.3 Designation of the lubricant to be used shall be as given in Appendix A.

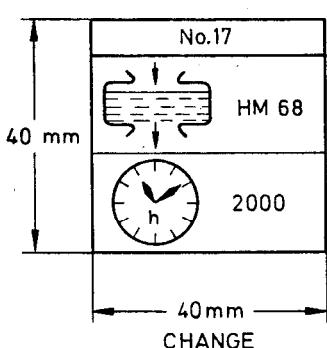
4.2.1.4 Symbol of the time interval h, in machine running hours.

4.2.2 Shape and size of small data plate — Small data plates shall preferably be squared shape. A suitable size is 40 mm square.

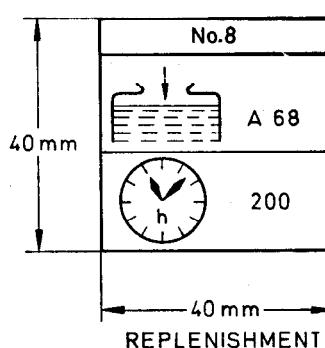
4.2.3 Small data plate facsimile — Examples for small data plates for individual action point have been given in Fig. 1.

5. Lubrication Time Intervals — The lubrication time intervals (in machine running hours), shall be supplied by the machine tool manufacturer.

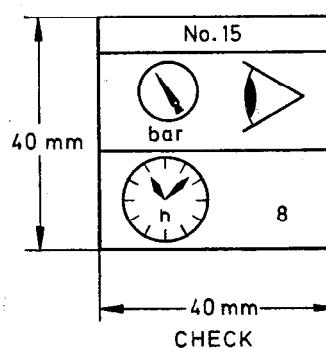
The user then can determine from these suitable intervals (for example, per shift, daily, weekly, monthly, etc) for his particular utilisation of machine.



EXAMPLE A



EXAMPLE B



EXAMPLE C

FIG. 1 EXAMPLE OF SMALL DATA PLATES FOR INDIVIDUAL ACTION POINT

Note — The dimensions are given as an example.

APPENDIX A

(Clauses 3.2.4 and 4.2.1.3)

CLASSIFICATION OF LUBRICANTS FOR MACHINE TOOLS

First Code Letter	Subdivision in Families According to Application Fields	Subdivision in Categories According to Particular Application Fields	More Particular Subdivision	Subdivision in Categories According to Particular Properties	Symbol and ISO Viscosity Grade ISO-VG	Detailed Application	Remarks
A	Total loss systems			Refined mineral oils	AN 68	Total loss general lubrication of lightly loaded parts	
C	Gears	Enclosed gears	Moderately loaded gears	Refined mineral oils with good anti-oxidation properties (straight or inhibited)	CB 32 CB 68 CB 150	Pressure, bath and oil mist (aerosol) lubrication of enclosed gears and allied bearings of headstocks, feed-boxes, carriages, etc. when loads are moderate	CB 32 and CB 68 can also be used for flood-lubricated, mechanically controlled clutches CB 68 may replace AN 68
			Heavily loaded gears	Refined oils with good anti-oxidation properties (straight or inhibited mineral oils) and with good load-carrying ability	CC 150 CC 320 CC 460	Pressure and bath lubrication of enclosed gears of any type (except hypoid gears) and allied bearings when loads are high, provided that the operating temperature is not above 70°C	They can also be used for manual or centralized lubrication of lead and feed screws and highly loaded slideways
F	Spindles, bearings, and associated clutches		Spindles and bearings	Refined mineral oils with very good anti-oxidation, anti-corrosion and anti-wear properties	FD 2 FD 5 FD 10 FD 22	Pressure bath and oil mist (aerosol) lubrication of plain or rolling bearings	They can also be used for application requiring particularly low viscosity oils, such as fine mechanisms hydraulic or hydro-pneumatic mechanisms, electromagnetic clutches, air-line lubricators and hydrostatic bearings
			Spindles, bearings and associated clutches	Refined mineral oils with very good anti-corrosion and anti-oxidation properties	FC 2 FC 10 FC 22	Pressure, bath and oil mist (aerosol) lubrication of plain or rolling bearings and associated clutches	They are required for lubrication of systems including clutches which involve the use of oils which do not contain anti-wear additives
G	Slideways			Refined mineral oils with good lubricity and tackiness properties preventing stick-slip	G 32 G 68 G 150 G 220	Lubrication of plain bearing slideways. They should be particularly useful at low traverse speeds to minimize discontinuous or intermittent sliding of the table (stick-slip)	They can be used for the lubrication of all sliding parts such as lead and feed screws, cams, ratchets and lightly loaded worm gears with intermittent service
H	Hydraulic systems	Hydrostatic systems		Refined mineral oils with very good anti-corrosion and anti-oxidation properties	HL 15 HL 32 HL 46 HL 68	Operation of general hydraulic systems. Lubrication of plain or anti-friction bearings and gears (hypoid types excepted)	They are also suitable for the lubrication of plain or rolling bearings, and all types of gears normally loaded (worm and hypoid gears excepted) HM 32 and HL 32, HM 68 and HL 68 may replace respectively CB 32 and CB 68
				Refined mineral oils with very good anti-corrosion anti-oxidation and anti-wear properties	HM 15 HM 32 HM 46 HM 68	Operation of general hydraulic systems which include highly loaded components	
				Refined mineral oils with good viscosity/temperature properties	HV 32 HV 46	Application in computers	In some cases, HV oils may replace HM oils
		Hydraulic and slideways systems		Refined mineral oils of HM type with anti-stick-slip properties	HG 32 HG 68	Specific application to machines with combined hydraulic and plain bearing slideways lubrication systems where discontinuous or intermittent sliding (stick-slip) at low speed is to be minimized	They can also be used for lubrication of separate slideways when an oil of this viscosity is required HG 32 and HG 68 may replace respectively G 32 and G 68
X	Application requiring grease	Multipurpose greases		Greases with very good anti-oxidation and anti-corrosion properties	XM 1 XM 2 XM 3	Plain rolling bearing, open gears and general greasing of miscellaneous parts	Grease XM 1 is used in centralized systems while greases XM 2 and XM 3 are dispensed preferably by cup or hand gun. The equipment manufacturer should identify the grease used for the initial filling of each item to ensure that the grease subsequently introduced is compatible with it

Note 1 — The prefix letter 'VG' designate the category 'Industrial liquid lubricants'. The group of letters which follow the letters 'VG' considered as a whole, forms a code. The first letter of this code identifies the family of the product considered, but the second letter when it exists, and any following letters have no particular significance.

Note 2 — The numerical group designation which appears after each code corresponds to the average kinematic viscosity of the lubricant measured at 40°C and expressed in millimetres squared per second (see Appendix B).

Note 3 — The three grades of grease class XM are numbered according to their consistency following the classification system of the National Lubricating Grease Institute (NLGI) of the USA (see Appendix C).

Note 4 — Against the ISO VG grade of oil given above, the machine tool manufacturers can recommend use of any particular brand of the oil conforming to this ISO-VG grade. However, intermixing of brand should be preferably avoided.

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A P P E N D I X B
(Clause 3.2.5)

VISCOSITY CLASSIFICATION OF LIQUID LUBRICANTS

Viscosity Grade ISO VG	Mid Point Kinematic Viscosity, cSt at 40°C	Kinematic Viscosity Limits, cSt at 40°C	
		Min	Max
2	2.2	1.98	2.42
3	3.2	2.88	3.52
5	4.6	4.14	5.06
10	10	9.00	11.0
15	15	13.5	16.5
22	22	19.8	24.2
32	32	28.8	35.2
46	46	41.4	50.6
68	68	61.2	74.8
100	100	90	110
150	150	135	165
220	220	198	242
320	320	288	352
460	460	414	506

Note — 1 cSt = 1mm²/s = 10⁻⁶ m²/s.

A P P E N D I X C
(Clause 3.2.6)

GRADES OF GREASE AND WORKED PENETRATION NUMBERS

<i>Grade</i>	<i>Worked Penetration</i>
XM 1	310 to 340
XM 2	265 to 295
XM 3	220 to 250

A P P E N D I X D

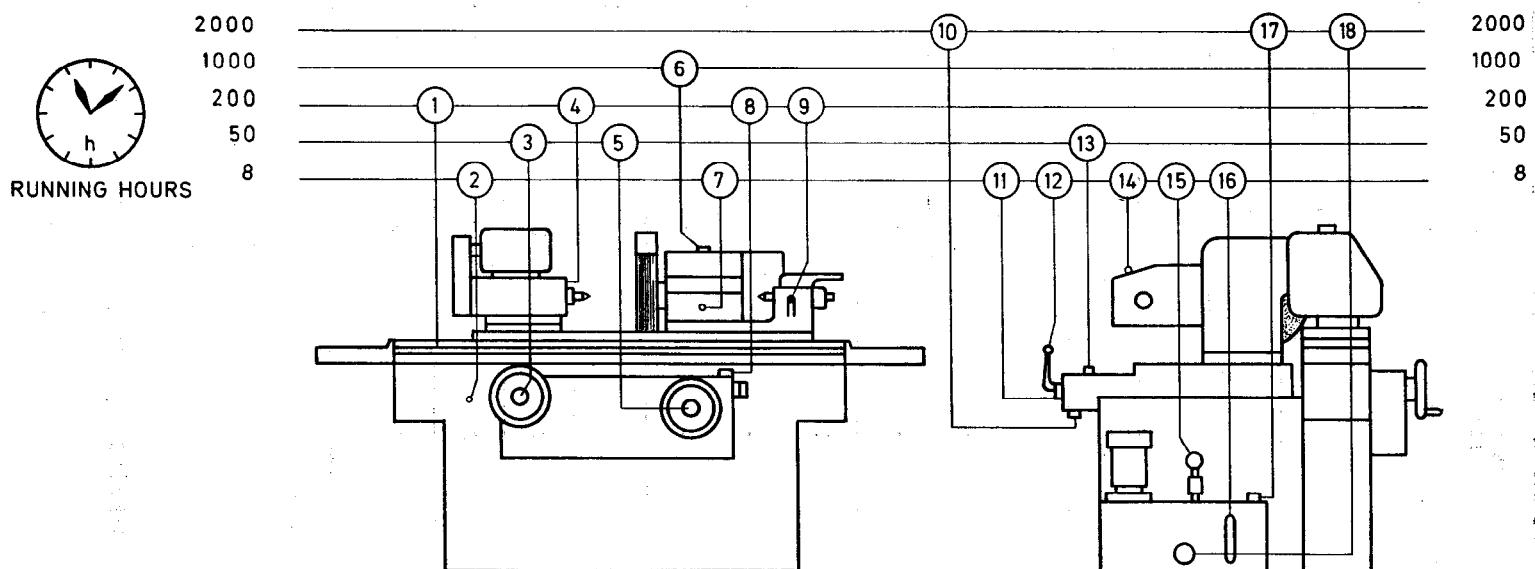
(Clause 3.4)

LAYOUT FOR LUBRICATION INSTRUCTION

EXAMPLE : CYLINDRICAL UNIVERSAL GRINDING MACHINE

MAKE..... TYPE.....

6



CAUTION, CLEAN ALL POINTS BEFORE LUBRICATING

MACHINE COMPONENT	TABLE SLIDEWAYS		TABLE TRA- VERSE MECHA- NISM	WORK HEAD SPINDLE	WHEEL FEED SYSTEM	WHEEL SPINDLE		WHEEL FINE FEED SYSTEM	TAIL- STOCK	WHEELHEAD SLIDEWAYS				INTERNAL GRIND- ING SPINDLE	HYDRAULIC UNIT			
ACTION POINT No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SYMBOL OF ACTION																		
NATURE OF ACTION														bar				
CHECK														8				
CHECK AND FILL IF NECESSARY		8						8			8					8		
OPERATE													8					
REPLENISH	200		50	200	50	1000		200	200		2000		50	8				
CLEAN OR REPLACE																2000		
CHANGE																2000		
LUBRICANT * DESIGNATION	G 68	A 68	XM 2	A 68	FD 10		A 68	G 68	G 68				FD 5	HM 68				
RESERVOIR CAPACITY (l)	2	0.3	0.1	0.3	1.5		0.1	0.1	4				0.2	75				

*See Appendix A, Appendix B and Appendix C also.

EXPLANATORY NOTE

This standard is based upon ISO 5169-1977 'Machine tools — Presentation of lubrication instructions'.

For the purpose of this standard, the classification for lubricants is adopted from ISO 3498-1979 'Lubricants for machine tools — Classification'.